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ATTENTION AND PREPARATORY PROCESSES IN THE CENTRAL
NERVOUS SYSTEM(U) CASE-WESTERN RESERVE UNIV CLEVELAND
OH U ROWLAND ET AL. AUG 86 ARO-28472.3-LS

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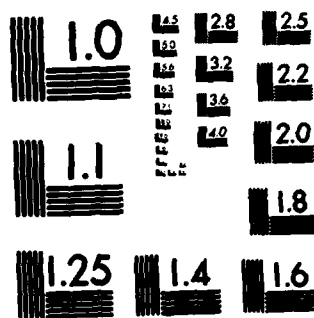
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Efforts were directed toward improved understanding of the "slow potential" (SP) of the brain. This electrically recordable dynamic differs from the conventional EEG in being nonrhythmic and of durations from 1 to many fold longer than the longest enduring components of the EEG. It is best elicited by use of motivating (unconditioned) stimuli and by signals (conditioned stimuli) related to them in the learning process. A study was made of the relation of multiple firing potentials of neurons to the SP as both are related to temporal (fixed interval).		

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20. ABSTRACT CONTINUED

conditioning controlled by medial forebrain bundle (MFB) electrical reward in the rat. A correlation was observed of the pacing of the level of expectancy in the trained subject with the SP, which, in this context, has been termed the Anticipatory Potential Gradient or APG.



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FINAL TECHNICAL REPORT

PROBLEM STUDIED

Our effort is directed toward improved understanding of the "slow potential" (SP) of the brain. This electrically recordable dynamic differs from the conventional EEG in being nonrhythmic and of durations from 1 to many fold longer than the longest enduring components of the EEG. It is best elicited by use of motivating (unconditioned) stimuli and by signals (conditioned stimuli) related to them in the learning process.

We are studying the relation of multiple firing potentials of neurons to the SP as both are related to temporal (fixed interval) conditioning controlled by medial forebrain bundle (MFB) electrical reward in the rat. We have observed a correlation of the pacing of the level of expectancy in the trained subject with the SP, which, in this context, we have termed the Anticipatory Potential Gradient or APG.

We are beginning to make comparisons between MFB and milk as reinforcements controlling the development and course of the SP.

RESULTS

The work completed under the contract has been reported in the publication listed below and in a second report being prepared for publication on methodology. Both of these have been sent to the ARO in previous interim reports. In accordance with Reporting Instructions (ARO Form 18, p.5) the technical material previously reported will not be repeated here.

Much of the last year has been devoted to restoring capabilities lost by the irreparable breakdown of our 20 year old Linc-8 computer and by the loss of our technician of 4 years experience. The computer was replaced by an IBM PC AT, a Keithley Data Acquisition System, an IBM Proprinter, and a Hewlett Packard Plotter, all provided by funds from the Case Western Reserve University Department of Psychiatry. We have written all new programs for this system, using BASICA, Fortran, and SOFT500 (for the Keithley DAS). Henry Gluck is greatly speeding up the processing rates of certain parts of the programs by use of assembly language programming. The methodology is fundamentally as developed for the Linc-8 by Henry Gluck but with expanded channel capacity for the averaging of slow potentials with attendant running standard deviations of averaged potentials. The new system provides far more convenience in on-line monitoring of the data collection, and ease of manipulation of the data for statistical and other evaluation.

We are presently training the second replacement of our former most experienced technician, Sue Sumergrad. The interim replacement was well-qualified but left to attend graduate school. These events have occurred at a time when our recently developed method extending the chronicity of our preparations, in one case up to 9 months,

has encountered difficulties. We require 3 to 6 months for full study of subjects and usually obtain this, but recent preparations have not lasted more than 6 weeks. The method is being further tested as we continue the studies previously described.

The work continues under a new Army contract.

PUBLICATIONS

Rowland, V., Gluck, H., Sumergrad, S., and Dines, G. Slow and multiple unit potentials in trace and temporal conditioning controlled by electrical reward in the rat. *Electroenceph. clin. Neurophysiol.*, 1985, 61: 559-568.

In preparation: Rowland, V. A cross-referencing method for simultaneous slow and multiple unit potential recording with implanted electrodes.

PARTICIPATING PERSONNEL

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Susan Sumergrad
Cindy Peters

